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ABSTRACT

Guidelines are presented for establishing large television centers in health science education institutions. Television distribution systems are described, and staff, equipment, space and budgetary requirements are discussed. Included are: (1) a proposed chart of organizational development and job descriptions; (2) suggested equipment purchases; (3) a possible design for a large television center; and (4) an approximate budget for establishing and operating such a center. Pictures of the television center at the Ohio State University Hospital are provided. (EMH)

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a medical television center

A Guide to Organizing a Large Television Center in HEALTH SCIENCE EDUCATIONAL INSTITUTIONS

by Robert E. Potts, Ph.D.
Director, Medical
Audiovisual and
Television Center
Ohio State University Medical Center

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The views expressed in the monograph are those of the author and do not necessarily reflect policies of the U.S. Department of Health, Education, and Welfare.

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About the Author. . .

Robert E. Potts is Director of the Medical Audio Visual and Television Center at The Ohio State University's Medical Center in Columbus, Ohio. Before coming to the Medical Center he was Director of Communications at Grand Valley State College in Allendale, Michigan, where he designed a complex audio and video dial access system. Prior to entering a full-time career in education he spent thirteen years in educational and commercial broadcasting, producing and directing many programs for national distribution through NET in New York. He also received three Golden Quills, a National Headliners Award, and a National Film Society Award.

Dr. Potts received a Bachelor of Fine Arts Degree from the College of Conservatory Music of the University of Cincinnati and a Doctor of Philosophy Degree in Educational Communications from The Ohio State University.

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STAFFING THE LARGE TELEVISION CENTER

It is important to staff a center with properly trained personnel who are carefully chosen. Personnel should be on a full contract and *not* on a part-time basis. Part-time personnel are just that. Some will have a full-time position elsewhere and that primary responsibility will take priority over the center. For example, some television centers have attempted to operate with part-time engineers or part-time producers who are employed elsewhere full time. The result has been totally unsatisfactory. There is nothing that will cause the failure of a center faster than to have it in operation only part of the time. It is essential to hire enough people to cover the needs of the center.

Figure 1 may be used as a guide to the personnel needs of a large center. Notice the placement of the director of the center within the medical organization.

A major production requires a staff of at least seven; two production personnel (director and floor director) and five engineers (two cameramen, a video man, an audio man, and a videotape man). The remaining three engineers shown in Figure 1 will be needed to provide playback and maintenance services for the rest of the center. Please note that even with this size staff only one production can be done at a time. As the demand for services increases, it may be necessary to add more engineers and other production staff.

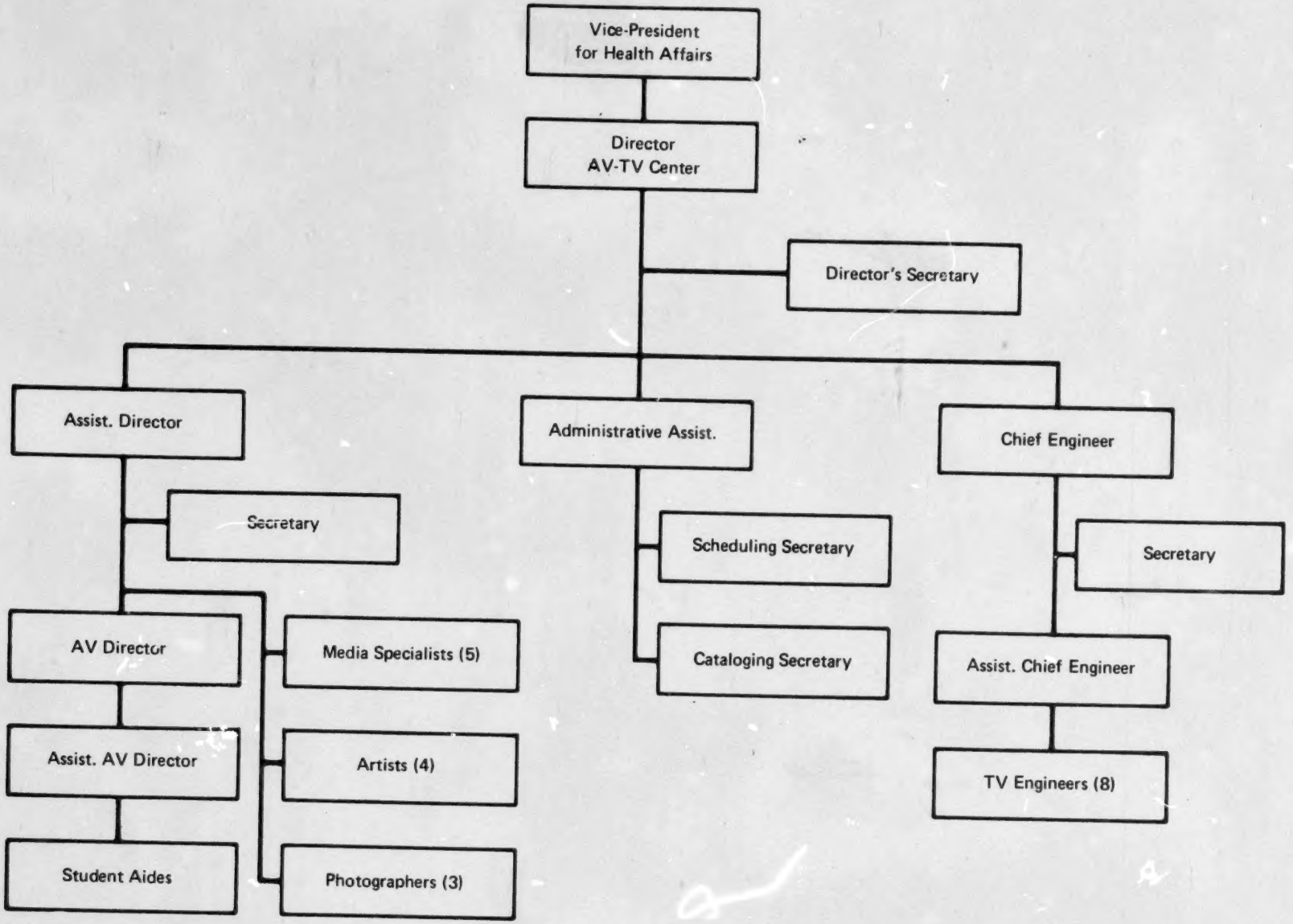
A job description is an inadequate tool for describing the responsibilities which accompany the various positions within a center. However, the following discussion may provide helpful guidelines.

Media Specialist or Producer/Director

A media specialist works very closely with the faculty. However, no job description can completely describe the interpersonal relationship that he must develop with the faculty. He must be a specialist in all areas of media development, from the making of an overhead transparency to the development of a computer-assisted instruction program. He must know what it takes to build a program as simple as an audio tape or as complex as a full television production. In selecting a media specialist, look for one with the most extensive experience in all areas of media development.

To insure his professional status, the media specialist must have a degree, preferably a masters. However, experience is more important than letters after his name.

Figure 1. Organization Table for a Large Television Center



Television Engineers

The job description of the television engineer is another requiring a more detailed explanation. Note the term "television engineer." There are a great many engineers who might meet the requirements for electronic engineer and would know how to electronically read a schematic on the operation of the television camera. However, to know how the television camera functions electronically is one thing; to know how to set it up, black and white or color, is quite another. To describe the television engineer as one who maintains television equipment is an injustice to him and to his employer.

Engineers should be selected on the basis of experience and technical knowledge. The latter is best assessed by interview with the chief engineer. If the center operates a transmitter, a first-class FCC license is essential. If not, it is not necessary to insist on that license. The license is frosting, but securing a man with strong skills and experience as a television engineer is far more important. Unfortunately, persons not in the field of television frequently do not have an adequate concept of the scope of the television engineer's responsibilities.

Administrative Assistant or Assistant Director

The position of administrative assistant or assistant director is especially valuable during the development years of the television center and the demands of the position increase as the center grows. All the responsibilities for gathering statistics, serving as liaison to the faculty, and keeping track of orders and billing fall to the administrative assistant. Accurate records are essential to establish the effectiveness of the center, to determine additional staff needs, and to manage accounts. This information will enable the director to run periodic evaluation surveys of media programs.

Clerical Staff

How many do you need? Whether you have a large operation or a small one, the position of secretary should be placed high on the list of persons to hire. The large center needs an especially competent secretary. Being able to listen and reply to requests from the faculty, keeping track of all the different types of filing and purchasing, cataloging, and scheduling the productions and playbacks takes a special kind of person.

A secretary's job description usually includes typing and answering the phone. However, in a large television center the secretarial positions are unlike those found in most business offices. The administrative secretaries are, of course, responsible to the administrators of the center and they must be able to carry out the normal executive secretarial responsibilities.

In addition, there are two other types of secretaries needed in the center. One is the scheduling secretary, the other is a cataloging secretary. Both positions carry a great deal of responsibility. If either one of these secretaries falters in her job, the service to the faculty can be greatly hampered and the reputation of the center severely damaged.

The *scheduling secretary* must keep track of all orders from the faculty for the use of television equipment and the playback of materials. In a large center she might receive as many as forty orders per day. One missed order creates a bad relationship that may take months to overcome. The *cataloging secretary* must be an expert at handling detail. She uses reports from faculty and media specialists to derive information by which programs produced by the center can be easily retrieved. In a large center producing eight or more programs a week, cataloging can become a tremendous job. The cataloging secretary must keep the center's cards up-to-date and must inform catalog holders of changes and additions.

Artists and Photographers

In the design of any large television center there must be a unit which produces the artwork needed for programs—this should include artists and photographers (both still and motion). Great care should be taken in hiring personnel for these positions. It is essential that they have experience in preparing materials for television. Generally, an artist or photographer will not understand a reference to a 3 x 4 ratio or a 10% loss on the raster (the overall viewing area of the picture tube). Therefore, be sure to have applicants provide a portfolio of their work along with their application so that it can be determined whether they are able to work with television (color, as well as black and white). Make sure that the motion-picture photographer is not a footage grinder. It takes a special type of movie *maker* to turn out good film that tells a story.

Use of Students in a Large Television Center

Whether to use students in a large center is always a difficult question and there is really no consensus among those presently operating large centers. The best suggestion that can be offered at this time is to decide simply on the basis of the center's individual needs and abilities. However, if it is decided to use students to operate television equipment, be sure that such a decision does not affect the overall quality of the product being prepared.

Salaries

Salaries are not easily discussed because of local variations. In New York the scale is higher; in a small midwest area salaries are lower. Nevertheless, there are limits. Learn what the market demands in terms of the center's locality and act accordingly. The following are suggested only as guidelines:

Director, 18-30,000; *Assistant Director,* 15-18,000; *Media Specialist,* 10-15,000; *Television Engineers,* 8.5-12,500; *Administrative Assistant,* 10-12,000; *Secretaries,* 6-9,200; *Chief Engineer,* 13-18,000; *Artists* and *Photographers,* 8-12,000.

EQUIPPING A LARGE TELEVISION CENTER

This is a very difficult area to deal with since manufacturers are constantly changing models and coming out with new types of equipment. It is sometimes a very sad but true fact that by the time an order is issued and the equipment arrives, new models have been produced making yours obsolete. It is not really that bad but it seems like it.

No one really disputes the necessity for good color in certain areas. However, there is still a place for black and white in medical education. For instance, color does not work well for showing x-rays. When using the small or half-inch recorders for self-evaluation studies, black and white is still very appropriate. There can be no substitute for color in surgery, neurology, histology, anatomy, and many other areas. Choose the best color cameras that your budget will allow; the true professional will never accept mediocrity.

What is good color equipment? How much of it should you have? Health education should take a lesson from commercial broadcasters and purchase only the best broadcast color equipment for use in a large television center. Most of the smaller inexpensive cameras cannot and will not do the job. This is especially true in areas that require accurate color. The best color cameras for a large television center (Plate 1) will range in price from $50,000-$75,000 each. However, as technological advancements are made, watch for the medium-priced cameras ($25,000-$35,000) to make a real bid for the top spot. Manufacturers are now beginning to produce color cameras which are a lot smaller than the one shown in Plate 1. There is still a great deal of argument over the quality that lower-priced cameras produce. However, some that have been shown in recent months require very little light and are small and lightweight. The color from one of these cameras demonstrated for the author was excellent.

The market for a black and white camera is wide open. Prices for this type of equipment range from $250-$7,000. Some have viewfinders (Plate 2) for a camera operator in the studio and others are non-viewfinder types used for surveillance, remote control, microscopes, etc.

Before the purchase of color equipment at The Ohio State University Medical Center, black and white cameras were used over the surgical field in the operating room (Plate 3). Frequently, these cameras had a remote control 10-1 zoom lens attached. Since the present color cameras are so large, it is impossible to use them in the same manner as the black and white. To solve this problem, the overhead camera has been replaced by a front-surface mirror and the color camera shoots into the mirror from the floor and down onto the surgical field.

There are other types of black and white television cameras that can play an important role in the effectiveness of the large center. Some of these are used with ½" videotape recorders (Plate 4). Others are small enough to fold up into a carrying case. These are useful in recording faculty lectures for self evaluation, and in teaching interview techniques to medical students, nursing students, and allied health students.

After cameras, video tape recorders have become the next largest item of purchase. Here there are no substitutes for the quardruplex videotape recorders (Plate 5). How many do you need? Three are desirable. Two are essential to allow the flexibility of dubbing and editing. One machine precludes this flexibility and necessitates a one-step system. In addition, it is necessary to provide your system with enough flexibility that you do not find yourself forced to play back all your tapes on the quardruplex records. This is largely for economic reasons. The quadruplex recorder should be primarily used to record the master material. The master material should then be dubbed to some type of helical recorder. Here again there are many different manufacturers and models to choose from. There is one company which produces a variety of recorders in a one-inch format (Plate 6) that use electronic controls to operate the different modes of the recorder. It is also possible to purchase this recorder with slow motion, add-on editing, and insert editing. The same manufacturer produces every type of recorder from the simplicity of a black and white player–*only*–all the way up to a highly sophisticated color one-inch recorder that meets all FCC requirements for broadcast. This last unit also has the capability of dubbing up from the one-inch helical to the two-inch quadruplex. Recently, the addition of a piece of equipment called a time-base corrector has made it possible for the user to apply any one-inch machine to dub up to the quadruplex format. It should also be pointed out that all these recorders and playback units are compatible with each other.

In addition to the one-inch recorders, half-inch recorders (reel-to-reel), and video cassette players (Plate 7) and recorders will need to be purchased. Here is an area where there seems to be some effort by the manufacturers to be compatible with one another. There has been a standardization with the Japanese machines. However, there is still one area of confusion with the half-inch units. The term EIAJ has been used rather freely. There are units that are advertised as EIAJ color and some are just advertised as EIAJ. All this means is that both machines are compatible in black and white. The specifications must read *EIAJ Color* if you want to be able to play back color and black and white tapes on any of the EIAJ standard machines. This is only true with the reel-to-reel machines.

The offering of the video cassettes (Plate 7) in 1972 has made a big difference in decisions about what to buy. The manufacturers of these units are producing three types of tape machines using three types of tape: half-inch, ¾ inch, and one inch. The manufacturer of the one inch cassette claims compatibility with his one-inch reel-to-reel machines. The half-inch manufacturer claims compatibility with his half-inch reel-to-reel units. There are primarily three manufacturers who are producing ¾ inch U-matic machines and they are claiming to be compatible with each other. There is one other company producing a half-inch machine, but it is not compatible with anyone else's. As you can see, there is a great deal involved in purchasing this type of equipment. However the video cassette is going to find a place in most large and small centers for students and faculty to retrieve previously recorded materials from departmental learning centers and medical libraries. It is a highly useful tool and produces extremely good color–so much so that some of the one-inch reel-to-reel systems will need improvement if they are going to keep abreast of this new video cassette equipment.

The price of this equipment ranges from approximately $900 to $1200 for the half-inch reel-to-reel recorders, from $3,000 to $30,000 for the one inch reel-to-reel recorders, and from $800 to $1600 for the video cassette machines. The quadruplex recorders range from $60,000 to $150,000.

SPACE REQUIREMENTS FOR A LARGE TELEVISION CENTER

Once the decision has been made that the large center is needed and sufficient funds for its support are available, decisions must be reached on the design and space requirements for the center. How large is a large center? The medical television center is usually considered large when it occupies 10,000 sq. ft. or more. The center at The Ohio State University Medical School occupies approximately 13,900 sq. ft. Of this, approximately 1,500 sq. ft has been allocated to storage. You will find there is never enough space for storage.

A centralized or decentralized system is another decision which must be reached. It is my personal opinion that a decentralized system paves the way for over-fragmentation of the program and does not allow all areas of the medical center to be utilized for reception of materials. The centralized system allows for total coverage of the medical center. However, there are some strong arguments for a combination of both. The Ohio State University operation might be called a centralized-decentralized system. Throughout the complex (Plate 8) are production centers that also act as distribution centers. The main center is located in the School of Allied Medical Professions Building where all major productions are made and subsequently distributed to the control rooms in the other buildings in the medical complex. The programs are then disseminated to lecture halls, classrooms, and seminar rooms in each building. To add to the flexibility of the system, these same distribution areas can, on demand, act independently from the main center and become production control rooms as well. This permits origination from any one or all of the areas, depending upon the need. For example, the University Hospital control room is a much used satellite production area. In the early days of the system, this control room (Plate 9) was the center of operations, mainly because the Hospital was the center of most activity. Two of the operating rooms (Plate 3) and one delivery room are equipped with television cameras. One camera is on a specially designed boom over the surgical field, and the other is used on the floor to orient students to the position of the patient and the location of each member of the surgical team, and to view blood pressure and respiration readings. With the addition of color, the camera over the surgical field was replaced with a front surface mirror. Also located in the Hospital is a small (15' x 15') television studio (Plate 2).

The control room in the School of Nursing (Plate 10) is very small. It is a full-color control room, but can be used for black and white production work when needed. There is no studio in the School of Nursing.

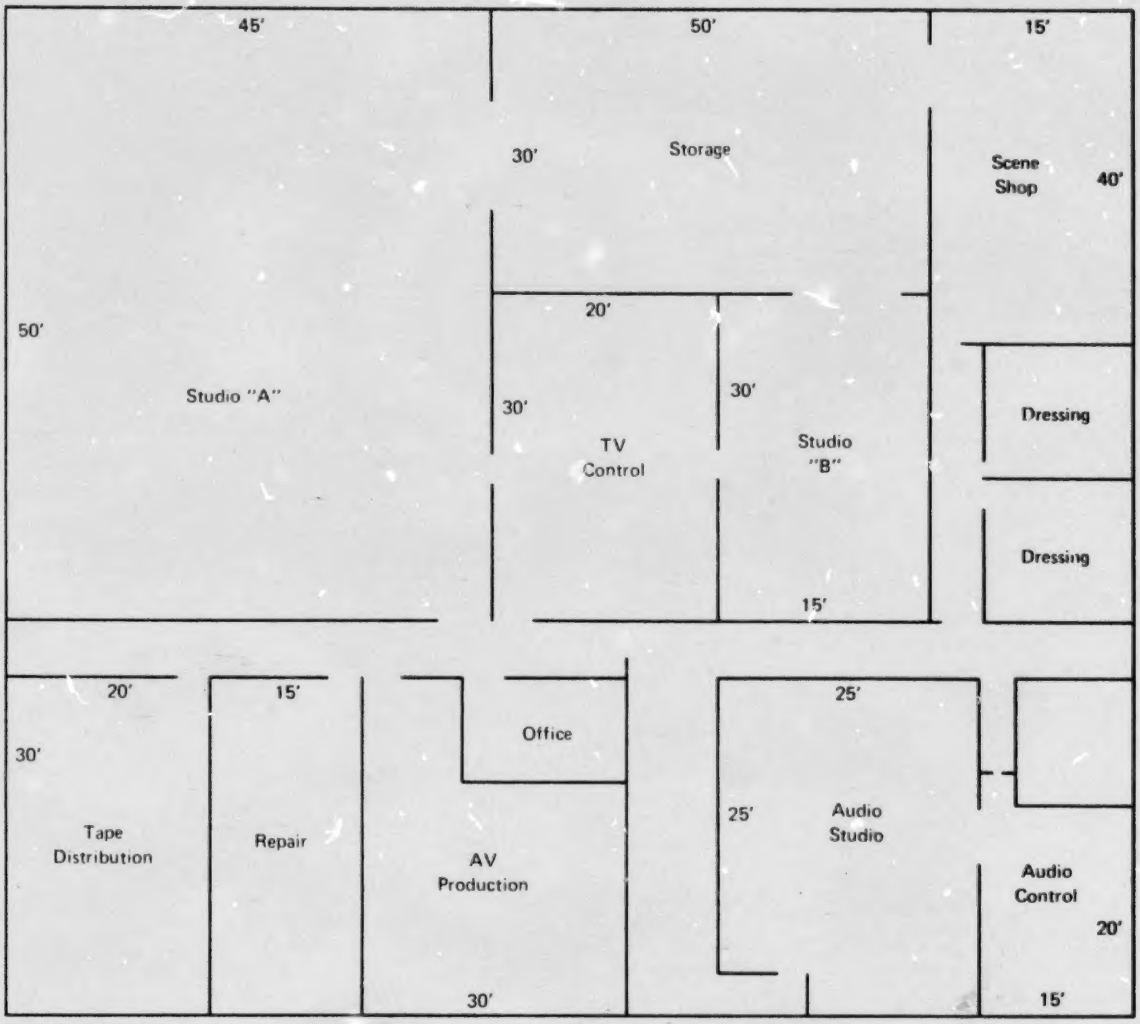
Both the Medical Administration Center and Graves Hall have full-color capability. The studio (Plate 4) in the Medical Administration Center was once a storeroom. This 400 sq. ft. area with a 13-foot ceiling is sometimes a little crowded, but it is still a highly useful production space. Adjacent to the studio is a very small production control room (Plate 11). This area contains all the support equipment, including that used for special effects necessary to produce high quality programs. Prior to the present production center in the School of Allied Medical Professions Building, this studio and control room served as the main production area. Because of the size of the Medical Administration Center's studio, the cameras were always backed against the far wall and the talent was always standing against the drapes. The heart of this production area is located one floor up in the distribution control room. The distribution switcher (Plate 12) in this area can relay as many as 12 different sources of material to any one or all 65 classrooms in Graves

Hall. The camera controls (Plate 13) and the color cameras are on wheels with a built-in video switcher and audio control console. With relative ease these units can be moved anywhere to originate color programming. However, do not overdo the moving of this equipment since it is not really meant to be bounced over elevator openings. Move it when necessary, but with great care. A color filmchain (Plate 14) for projection of and integration of 16 mm films and slides into the programming is also a very important piece of equipment.

Many hours need to be spent with the architects in planning for central production and distribution areas. They need to realize that a television studio has some special requirements. You are not building a warehouse, nor are you trying to create hurricane winds with the air conditioning. However, certain conditions must be honored. Good communications with the architect will enable him to understand fully what relationships you are trying to obtain among the areas in the facility. For instance, the ideal ceiling height for a television studio is at least 20 feet. This will allow enough space for conduit and air handling duct work and still provide at least 16 feet of clear space between the studio floor and the lighting grid. A studio of adequate size would be approximately 2,250 sq. ft. (Plate 15). The floor must be *one smooth* slab of concrete sealed to prevent dusting. The light grid should cover the entire studio on a four-foot center checkerboard pattern. Pay close attention to the acoustical condition of the studio (54 db on a C scale) and the cooling and humidity conditions. The humidity should be 45-50 per cent and cooling from 65-70°. These figures are especially critical in the tape handling areas. The drapery track should be 12 feet from the floor. Be sure to provide for camera and microphone outlets on both sides of the studio. One hundred ten and 220 volt electrical outlets are also good ideas. Provide hot and cold water and drains in the studio with quick disconnects for lab sinks.

Why such a big studio? For proper back lighting, the talent should be a minimum of eight feet from the background. Because television has a tendancy to flatten objects, lighting engineers need space for positioning and setting lighting in order to provide depth to the picture. Cameramen need space to secure proper angles for good television shots. Often a center will be shooting more than one series of programs at a time. In a small studio, production time is wasted in striking and resetting the sets for each series. If at least two sets can be left in place, time will be saved and production costs reduced. Although the studio may be 45' x 50', all of the footage cannot be utilized because of draperies and sets. Adjacent to the studio should be the main production control room (Plate 16). It is similar to the one seen earlier (Plate 9) only larger and equipped with far greater capabilities. The size of the control room in Plate 16 is approximately 600 sq. ft., and is planned on a computer-type floor. The platform on which the director and the audio man are sitting is approximately 144 sq. ft. The window to the left looks into the large studio. To the right not seen in another studio 900 sq. ft. The smaller studio has a dual purpose of television productions and film productions. The drawing in Figure 2 indicates a possible design for a large television center. The doors leading from the studios to the storage area should be at least 10 feet wide and 12 feet high. The door from the storage room to the street should be at street level, motorized, and 13 feet wide and 12 feet high to allow specific types of vehicles to be brought into the studio for production work.

Figure 2. Possible Design for Large Television Center



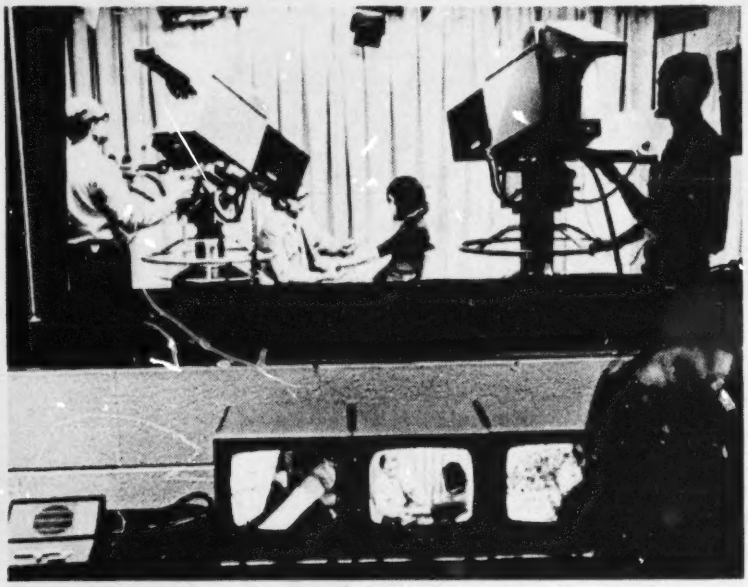


Plate 1. Broadcast color cameras producing high quality color pictures.

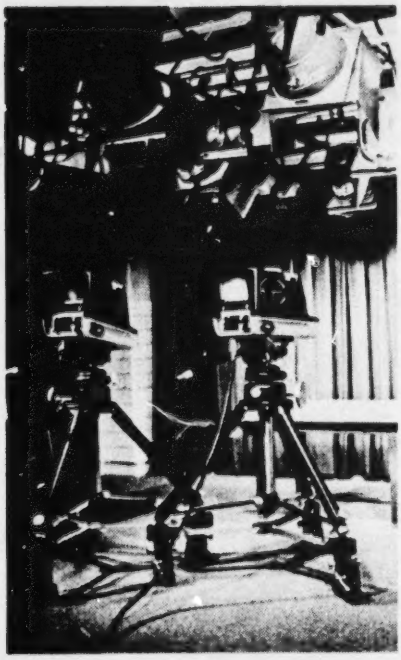


Plate 2. Black and white view finder cameras for use in a TV studio or on remote locations.

Plate 3. Black and white cameras being used during surgery. Note small camera directly over field.

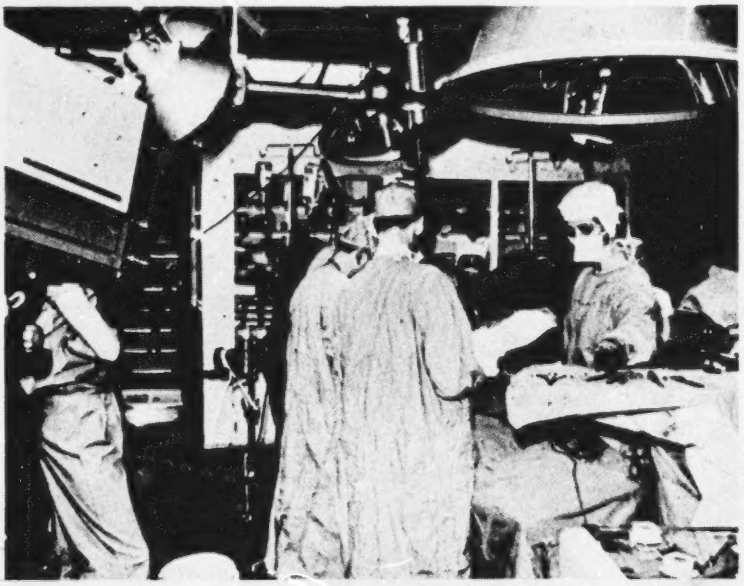


Plate 4. A small black and white portable camera being used with a ½ inch VTR (reel to reel).

Plate 5. Two high band color broadcast quadruplex VTR's.

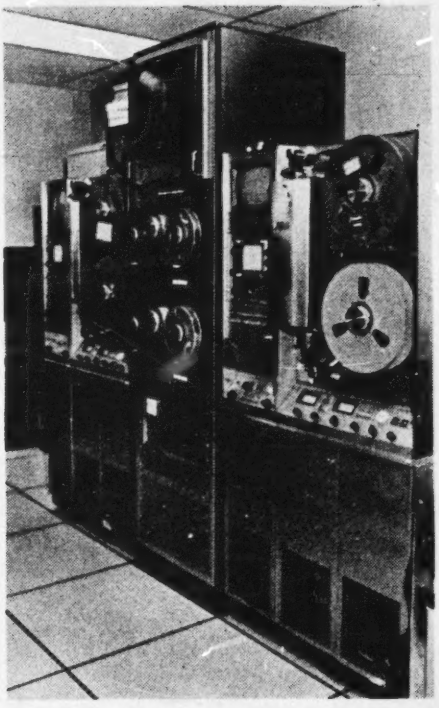
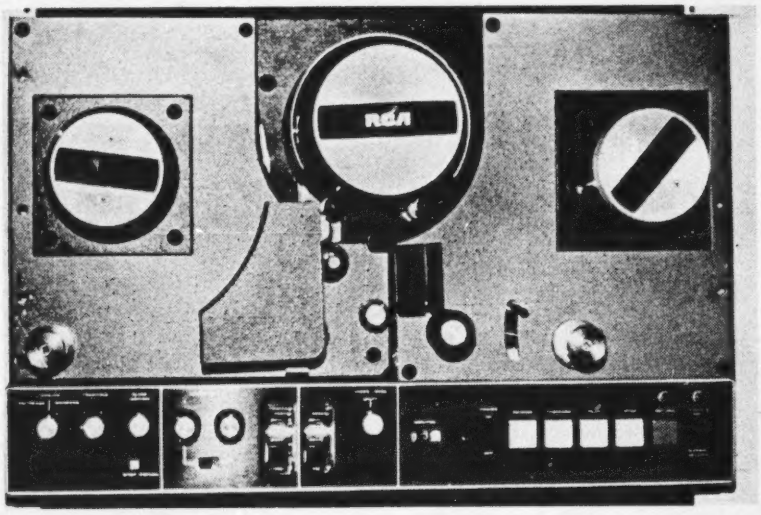


Plate 6. One-inch helical VTR.



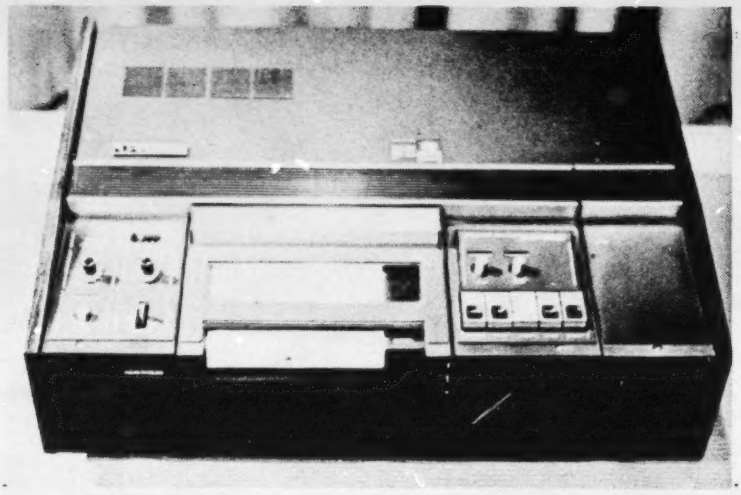


Plate 7. ¾ inch video cassette recorder (color).

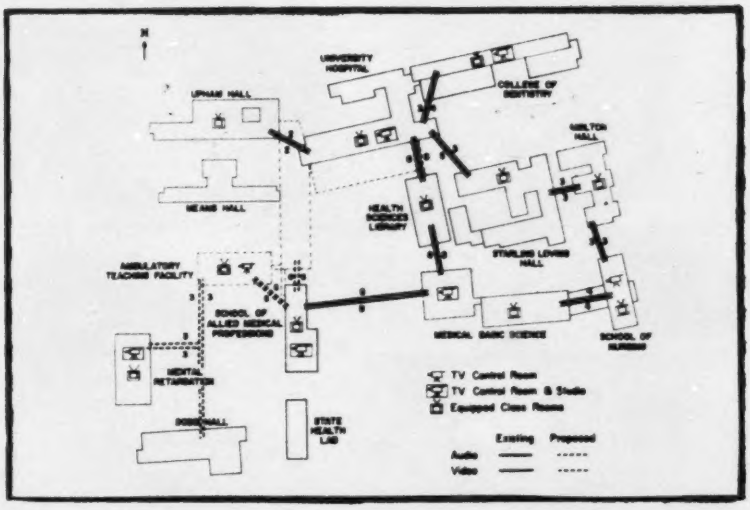


Plate 8. System used by the Ohio State University College of Medicine for the distribution of media materials.

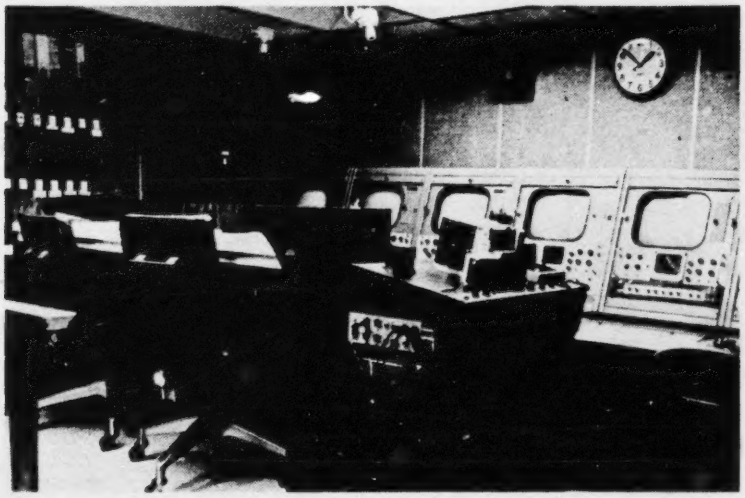


Plate 9. TV control room in the Ohio State University Hospital.

FUNDING AND CHARGES

In any media program, the question of charging or not charging for services always poses a dilemma. Many who are associated with successful centers will say that there should be no charge for any type of undergraduate instructional material. Any charges made, they assert, should be against graduate activities and outside projects such as continuing medical education and medical conferences. While this is an admirable attitude, a center operating under such a policy cannot hope to be self-supporting. The charges required for outside work to offset the cost of undergraduate programs would be prohibitive. Costs must always be weighed against benefits realized and a good cost analysis is always a vital element of planning. A successful media program requires a total commitment from the medical school and those supporting that school. Anything less will likely prove a waste of time and money in the long run.

When planning a large center, be prepared to establish an operating budget that will support that decision. Under no circumstances should a commitment be made to purchase vast amounts of hardware without the same type of commitment to hire competent personnel and provide adequate operating funds.

Determining precisely the operating budget for a large center is just as difficult as determining salary ranges for its staff. As stated earlier, a great deal depends upon the geographical location of the center. However, it would not be unrealistic for a large media center that is fully staffed in a medium market to need an operating budget of $500,000. This would include salaries as well as materials. This is not to say that in the beginning a smaller budget will not get the center started. However, it must be realized that if the center is to grow to its proper size, the $500,000 is necessary today. A more realistic plan might be to grow from $200,000 to $500,000 over a seven year period. Again, it should be emphasized that these figures are for an operating budget and do not include the cost of hardware. For a large center, plan on spending at least $1,000,000 as an initial outlay and then another $1.5 million to complete the center over a span of seven years. In other words, when the center is completed with hardware and staff, it will be approximately a $3 million operation.

In response to the question of where operating funds should come from, sometimes such money is available from state and federal agencies. So if you are applying for federal funds to construct a building, you should include in the application the money necessary to equip the building for the use of media. Some favorable project areas are: cancer diagnosis and treatment, improving patient care, family practice, and improving medical services to rural areas. One such project might be the development of instructional materials for emergency squads serving rural areas. If you fail the first time, do not give up. Keep applying. Redefine areas questioned by the granting agency. Caution. It is nice to have a grant, but total reliance on grants to support a media program may cause serious problems in the future.

Because of their high cost, there has been a great deal of discussion as to the practicality of proliferating large media centers in every school. Large, regional production centers serving the needs of smaller schools in a given area might be a more sensible approach. Therefore, before an administration decides to develop a large center, it should give careful consideration to the regional concept. Two or three million dollars is a lot to invest unnecessarily.

In summary, it is important to keep the following in mind when planning a large television center.

1. Make the director of the center responsible to the highest adminstrator possible, for example, the Vice President of Health Affairs.
2. Hire the best staff possible to operate the center. Hire enough of these professionals to fulfill the goals of the center.
3. Purchase the best hardware that the budget will allow. To realize the greatest benefits for your efforts, full broadcast color equipment is preferred.
4. Plan not to charge the departments for their efforts in developing instructional materials. If any charges are made they should be for post-M.D. education, health professional conferences, and continuing medical education development.
5. Plan a large enough budget to get the job done. Remember, this is an expensive undertaking, but over the long haul, it will more than pay for itself in high-quality instruction for all health professionals. Do not allow the media center to be caught in a trap of needing federal or private funds to meet all the responsibilities for its existence.
6. Design the large center to consume a *minimum* of 10,000 sq. ft. for production of materials. Do not underestimate the need for large studios and adequate storage space. Plan for needs of the future, not just those of today.
7. Plan the system around a centralized concept with the ability to decentralize when the need arises. Also provide for the ability to develop media systems within areas that may have specific needs not necessarily common to the rest of the system.
8. For instructional materials, always attempt to use a video signal for the best picture quality possible and an RF distribution system for possible concentration on educational programs for patients.

There is one last point that needs to be stressed and this point should carry the highest priority. Remember that the center should be conceived to provide quality service to the health education faculty. To reach this goal, as many avenues as possible must be provided for the faculty to use the talents of the center. No matter how simple the request, faculty must *never* be told to seek help elsewhere. It is difficult to get excited about making an overhead transparency. However, in order for the center to meet its responsibilities the same type of enthusiasm must be shown for the making of a transparency as is shown for the production of a highly sophisticated television program.